

IN THE CLAIMS

Please cancel claims 1-39 and add the following:

Claims 1-39 (canceled)

40. (new): A polymer-clay nanocomposite comprising:

- (i) a melt-processible matrix polymer, and incorporated therein
- (ii) an intimate mixture of at least two swellable smectite layered clay materials, wherein at least 75 percent of the layered clay material is dispersed in the form of individual platelet particles and tactoids having a thickness of less than or equal to 20 nm in the matrix polymer.

41. (new): The nanocomposite of claim 40, wherein the melt-processible matrix polymer comprises a polyester, polyetherester, polyamide, polyesteramide, polyurethane, polyimide, polyetherimide, polyurea, polyamidamide, polyphenyleneoxide, phenoxy resin, epoxy resin, polyolefin, polyacrylate, polystyrene, polyethylene-co-vinyl alcohol, or a copolymer thereof, or a mixture thereof.

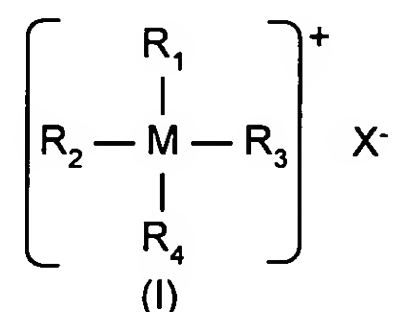
42. (new): The nanocomposite of claim 40, wherein the melt-processible matrix polymer comprises poly(m-xylylene adipamide), EVOH, or a copolymer thereof, or a mixture thereof, or poly(ethylene terephthalate) or a copolymer thereof, or a mixture thereof.

43. (new): The nanocomposite of claim 40, wherein the intimate mixture of at least two swellable smectite layered clay materials comprise clay materials that are natural, synthetic or modified phyllosilicates.

44. (new): The nanocomposite of claim 40, wherein the intimate mixture of at least two swellable smectite layered clay materials are clay materials that are natural, synthetic

or modified montmorillonites, saponites, hectorites, micas, vermiculites, bentonites, nontronites, beidellites, volkonskoites, magadites, kenyaite, or a mixture thereof.

45. (new): The nanocomposite of claim 40, wherein the intimate mixture of at least two swellable smectite layered clay materials are mixtures of a bis(2-hydroxyethyl) octadecyl methyl ammonium montmorillonite and a dodecyl ammonium montmorillonite, an octadecyl trimethyl ammonium montmorillonite and a tetramethyl ammonium montmorillonite, a dodecyl ammonium montmorillonite and a tetramethyl ammonium montmorillonite, or a dodecyl ammonium montmorillonite and a sodium montmorillonite.
46. (new): The nanocomposite of claim 40, wherein the layered clay materials are free flowing powders having a cation exchange capacity from about 0.9 to about 1.5 meq/g and wherein at least 50 percent of the layered clay materials are dispersed in the form of individual platelet particles and tactoids in the matrix polymer and wherein the tactoids have a thickness of less than about 20 nm.
47. (new): The nanocomposite of claim 40, wherein the intimate mixture of layered clay materials is intercalated with an organic cation or a mixture of organic cations and wherein the organic cation is represented by the formula (I):



wherein M is either nitrogen or phosphorous; X is a halide, hydroxide, or acetate anion, preferably chloride and bromide; and R₁, R₂, R₃, and R₄ are independently organic and/or oligomeric ligands or may be hydrogen.

48. (new): The nanocomposite of claim 47, wherein at least one of R_1 , R_2 , R_3 , and R_4 is an alkyl group having 12 or more carbons.
49. (new): The nanocomposite of claim 47, wherein the organic cation comprises an alkyl ammonium ion, an alkyl phosphonium ion, a polyalkoxylated ammonium ion, or a mixture thereof, and wherein the alkyl ammonium ion comprises tetramethyl ammonium, hexyl ammonium, butyl ammonium, bis(2-hydroxyethyl dimethyl ammonium, hexyl benzyl dimethyl ammonium, benzyl trimethyl ammonium, butyl benzyl dimethyl ammonium, tetrabutyl ammonium di(2-hydroxyethyl) ammonium, dodecyl ammonium, octadecyl ammonium, octadecyl trimethyl ammonium, bis(2-hydroxyethyl) octadecyl methyl ammonium, or octadecyl benzyl dimethyl ammonium and wherein the alkyl phosphonium ion comprises tetrabutyl phosphonium, trioctyl octadecyl phosphonium, tetraoctyl phosphonium, or octadecyl triphenyl phosphonium.
50. (new): The nanocomposite of claim 49, wherein the polyalkoxylated ammonium ion is derived from a hydrochloride salt of oligooxyethylene amine with a number average molecular weight of about 1100 g/mol, a hydrochloride salt of oligooxypropylene amine with a number average molecular weight of about 640 g/mol, a hydrochloride salt of octadecyl bis(polyoxyethylene[15]) ammonium chloride, wherein the numbers in brackets are the total number of ethylene oxide units.
51. (new): The nanocomposite of claim 49, wherein the alkyl ammonium ion comprises tetramethyl ammonium, hexyl ammonium, butyl ammonium, bis(2-hydroxyethyl dimethyl ammonium, hexyl benzyl dimethyl ammonium, benzyl trimethyl ammonium, butyl benzyl dimethyl ammonium, tetrabutyl ammonium di(2-hydroxyethyl) ammonium, dodecyl ammonium, octadecyl ammonium, octadecyl trimethyl ammonium, bis(2-hydroxyethyl) octadecyl methyl ammonium, or octadecyl benzyl dimethyl ammonium; and wherein the alkyl phosphonium ion comprises tetrabutyl phosphonium, trioctyl octadecyl phosphonium, tetraoctyl phosphonium, or octadecyl triphenyl phosphonium; wherein the polyalkoxylated

ammonium ion is derived from a hydrochloride salt of oligooxyethylene amine with a number average molecular weight of about 1100 g/mol, a hydrochloride salt of oligooxypropylene amine with a number average molecular weight of about 640 g/mol, a hydrochloride salt of octadecyl bis(polyoxyethylene[15]) amine or octadecyl methyl bis(polyoxyethylene[15]) ammonium chloride, wherein the numbers in brackets are the total number of ethylene oxide units.

52. (new): The nanocomposite of claim 47, wherein the organic cation comprises tetramethyl ammonium, octadecyl trimethyl ammonium or a mixture thereof.

53. (new): The nanocomposite of claim 40, wherein the melt-processible matrix polymer is poly(ethylene terephthalate) or a copolymer thereof and the intimate mixture of at least two swellable smectite layered clay materials are clay materials that are a dodecyl ammonium montmorillonite, Wyoming sodium montmorillonite, or synthetic phyllosilicate.

54. (new): An article prepared from the nanocomposite of claim 40.

55. (new): The article of claim 54 in the form of film, sheet, perform, profile, an extruded article, a molded article, a molded container, or a bottle.

56. (new): An article having a plurality of layers wherein at least one layer is formed from the nanocomposite of claim 40.

57. (new): The article of claim 56, wherein the nanocomposite is disposed intermediate to two other layers.

58. (new): A process for preparing a polymer-clay nanocomposite comprising:

(i) preparing an intimate mixture of at least two swellable layered smectite clay materials; and

(ii)incorporating the intimate mixture with a matrix polymer by melt processing the matrix polymer with the mixture to form a polymer-clay nanocomposite.

59. (new): The process of claim 58, wherein step (i) is conducted by intimately mixing at least two swellable layered clay materials in a solvent, wherein the solvent is water, an alcohol, a chlorinated solvent, a ketone, an ester, an ether or a mixture thereof; and wherein step (ii) is conducted by a melt compounding extrusion process.